

**Greatest Of All Times**

**108**

**G  
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**Globally selected  
PERSONALITIES**

**It is not enough to  
have a good mind;  
the main thing is to  
use it well.**



**René Descartes**

 **wonderful quote**



**31 Mar 1596 <::><::><::> 11 Feb 1650**

Compiled by:  
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31 March 1596



11 February 1650

[https://en.wikipedia.org/wiki/Ren%C3%A9\\_Descartes](https://en.wikipedia.org/wiki/Ren%C3%A9_Descartes)

## René Descartes



Portrait after [Frans Hals](#)<sup>[note 2]</sup>

<b>Born</b>	31 March 1596 <a href="#">La Haye en Touraine</a> , Touraine, <a href="#">Kingdom of France</a> (now Descartes, Indre-et-Loire)
<b>Died</b>	11 February 1650 (aged 53) <a href="#">Stockholm</a> , <a href="#">Swedish Empire</a>
<b>Education</b>	<ul style="list-style-type: none"><li>• <a href="#">Collège Royal Henry-Le-Grand</a> (1607–1614)</li><li>• <a href="#">University of Poitiers</a> (LL.B., 1616)</li><li>• <a href="#">University of Franeker</a> (no degree)</li><li>• <a href="#">Leiden University</a> (no degree)</li></ul>
<b>Children</b>	<a href="#">Francine Descartes</a>
<b>Era</b>	<ul style="list-style-type: none"><li>• <a href="#">17th Century</a></li><li>• <a href="#">Age of Enlightenment</a></li></ul>
<b>Region</b>	<ul style="list-style-type: none"><li>• <a href="#">Western philosophy</a><ul style="list-style-type: none"><li>• <a href="#">Dutch philosophy</a></li><li>• <a href="#">French philosophy</a></li></ul></li></ul>
<b><u>School</u></b>	<ul style="list-style-type: none"><li>• <a href="#">Rationalism</a></li><li>• <a href="#">Cartesianism</a></li><li>• <a href="#">Mechanism</a></li><li>• <a href="#">Innatism</a><sup>[1]: 257</sup></li><li>• <a href="#">Foundationalism</a><sup>[2]</sup></li></ul>

- [Conceptualism](#)<sup>[3]:43</sup>
- [Augustinianism](#)<sup>[4]</sup>
- [Indirect realism](#)<sup>[5]:136</sup>
- [Correspondence theory of truth](#)<sup>[6]</sup>
- [Corpuscularianism](#)<sup>[7]</sup>
- [Theological voluntarism](#)<sup>[note 1]</sup>

**Thesis**      [Untitled LL.B. thesis](#) (1616)

**Main interests**      [Epistemology](#), [metaphysics](#), [mathematics](#), [physics](#), [cosmology](#), [ethics](#)

**Notable ideas**      hide  
See list

- 
- [Cogito ergo sum](#)
- [Method of doubt](#)
- [Subjectivity](#)
- [Method of normals](#)
- [Analytic geometry](#)
- [Cartesian coordinate system](#)
- [Imaginary number](#)
- [Mind–body problem](#)
- [Cartesian dualism](#)
  - [Interactionism](#)
  - [Trialism](#)
- [Cartesian circle](#)
- [Foundationalism](#)
- [Mathesis universalis](#)
- [Folium of Descartes](#)
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- [Dream argument](#)
- [Conservation of momentum](#) (*quantitas motus*)
- [Balloonist theory](#)
- [Descartes' Rule of Signs](#)
- [Wax argument](#)
- [Trademark argument](#)
- [Causal adequacy principle](#)
- [Res cogitans/res extensa](#) distinction
- [Conatus](#)

**Signature**

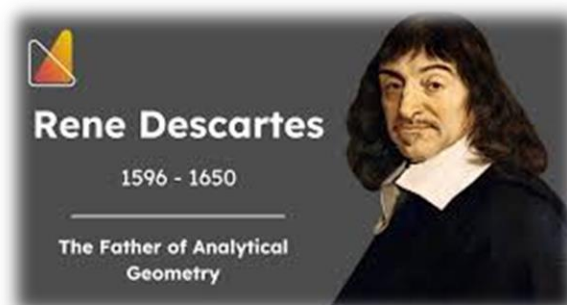


**René Descartes** (/deɪˈkɑːrt/ *day-KART* or UK: /ˈdeɪkɑːrt/ *DAY-kart*; French: [ʁəne dekaʁt] ; 31 March 1596 – 11 February 1650) was a French philosopher, [scientist](#), and [mathematician](#), widely considered a seminal figure in the emergence of [modern philosophy](#) and [science](#). Mathematics was paramount to his method of inquiry, and he connected the previously separate fields of [geometry](#) and [algebra](#) into [analytic geometry](#). Descartes spent much of his working life in the [Dutch Republic](#), initially serving the [Dutch States Army](#), and later becoming a central intellectual of the [Dutch Golden Age](#). Although he served a [Protestant state](#) and was later counted as a [deist](#) by critics, Descartes was [Roman Catholic](#).

Many elements of Descartes's philosophy have precedents in late [Aristotelianism](#), the [revived Stoicism](#) of the 16th century, or in earlier philosophers like [Augustine](#). In his [natural philosophy](#), he differed from the [schools](#) on two major points. First, he rejected the splitting of [corporeal substance](#) into [matter](#) and form; second, he rejected any appeal to [final ends](#), divine or natural, in explaining natural phenomena. In his theology, he insists on the absolute freedom of [God's act of creation](#). Refusing to accept the authority of previous philosophers, Descartes frequently set his views apart from the philosophers who preceded him. In the opening section of the [Passions of the Soul](#), an [early modern](#) treatise on emotions, Descartes goes so far as to assert that he will write on this topic "as if no one had written on these matters before." His best known philosophical statement is "[cogito, ergo sum](#)" ("I think, therefore I am"; French: *Je pense, donc je suis*), found in [Discourse on the Method](#) (1637, in French and Latin, 1644) and [Principles of Philosophy](#) (1644, in Latin, 1647 in French). The statement has either been interpreted as a logical [syllogism](#) or as an intuitive thought.

Descartes has often been called the father of modern philosophy, and is largely seen as responsible for the increased attention given to [epistemology](#) in the 17th century. He laid the foundation for 17th-century continental [rationalism](#), later advocated by [Spinoza](#) and [Leibniz](#), and was later opposed by the [empiricist](#) school of thought consisting of [Hobbes](#), [Locke](#), [Berkeley](#), and [Hume](#). The rise of early modern rationalism—as a systematic school of philosophy in its own right for the first time in history—exerted an influence on modern [Western thought](#) in general, with the birth of two rationalistic philosophical systems of Descartes ([Cartesianism](#)) and Spinoza ([Spinozism](#)). It was the 17th-century arch-rationalists like Descartes, Spinoza, and Leibniz who have given the "[Age of Reason](#)" its name and place in history. Leibniz, Spinoza, and Descartes were all well-versed in mathematics as well as philosophy, with Descartes and Leibniz additionally contributing to a variety of scientific disciplines. Although only Leibniz is extensively recognized as a [polymath](#), all three rationalists integrated disparate domains of knowledge into their respective works.

Descartes's [Meditations on First Philosophy](#) (1641) continues to be a standard text at most university philosophy departments. Descartes's influence in mathematics is equally apparent, being the namesake of the [Cartesian coordinate system](#). He is credited as the father of analytic geometry—used in the discovery of infinitesimal [calculus](#) and [analysis](#). Descartes was also one of the key figures in the [Scientific Revolution](#).



# Contribution to Mathematics

<https://valiantceo.com/rene-descartes-and-his-contribution-to-mathematics/>

Rene Descartes is remembered for making a great contribution to modern geometry and algebra. Born in 1596, his contribution to philosophy made western philosophy and math thrive. Due to this, he is acknowledged as the father of today's philosophy. He gained another title as the founder of modern analytical geometry.

Descartes successfully bridged algebra with geometry. This foundation was later used to develop calculus and analysis. He explained how geometrical shapes could be used to explain algebraic equations. He broke off from the traditional way of explaining things and began using science. His achievements are used in both physics and math to date.

## Discovery of the Cartesian Coordinates

One of the major math contributions that Rene Descartes made is Cartesian Coordinates. He explained how the location of a place could be measured by the use of coordinates. He used perpendicular lines that intersect at the origin to represent the distances. This concept was developed further by other math professionals many years later. Each coordinate is described through a horizontal and vertical number.

Both lines cross at one-point, which Rene Descartes called the origin. From this point, he would successfully measure both the X and the Y axis or locations. The origin determines if a location is positive or negative. Today, Cartesian Coordinates is used in modern engineering, physics, and astronomy. Computer graphics and geometry-based data processing use Cartesian Coordinates.

The impact of René Descartes' contribution to mathematics is significantly felt to date. It's nearly 400 years later, but students still struggle to understand the concepts. Algebra, calculus, and geometry are specifically challenging for many students. Keeping focus and working on problems can help you learn math fast. If you need to learn better, spend time reading step-by-step solutions from experts. You will get all the solutions you need from [algebra 1 problems and answers](#) on PlainMath. The algebra math questions and answers are prepared by experts to help you learn math without facing any challenges.

## The Rule of Signs

Analytical geometry was not a priority for Rene Descartes. However, some of the concepts prompted the development of other concepts that were interrelated. One of the concepts was the Rule of Signs. It was used to determine if a number was positive or negative. This rule was adopted for use when showing superscript or subscript powers. The concept is used when determining the total real zeros in a polynomial function.

## The father of analytical geometry

Geometry is used in a wide range of cases. In science, it is used to measure distances between planets and stars. It is used to determine magnetic and electric influence in an area. It all started in the 1630s when Rene Descartes began [using Viète algebra](#). In the process, he discovered geometry could be used to determine varying distances.

He began studying complex geometry using curves. He insisted on the need to use algebraic curves to study non-static distances. His emphasis was that the relationship

between  $x$  and  $y$  dictates the curve. Analytical geometry formed the basis for calculus. The algebra concept was developed by Archimedes around 285 – 212 BC. These concepts were useful later when formulas for calculating the area of cylinders were developed.

### Geometrical Calculus

Rene Descartes was instrumental in the development of Geometrical Calculus. This is a math concept that brings together geometric algebra, differentiation, and integration. While algebra focused on equations, calculus focused on functions and rate of change. Differentiation calculates the rate of change in a function. Integration calculates the area covered by a curve in a function. Analytical geometry is [the foundation of Calculus](#) and its concepts.

Calculus is considered a hard math topic, but it's easy if you understand algebra. Before the development of geometrical calculus, distances were measured on static objects. Calculus helped measure the distances of moving objects. For example, the planets are constantly moving around the sun. If a spaceship is moving from the earth to planet X, its distance will keep changing. Math experts need to calculate the exact distance it will be by the time the ship lands. Without geometrical calculus, the spaceship will miss the target by millions of miles.

### Conclusion

Rene Descartes is considered the father of modern philosophy. He is also acknowledged as the father of modern mathematics. His major contribution to math was the invention of the Cartesian coordinate system. He later developed analytical geometry, calculus, and algebra. His influence in math is used to date in the growth of modern physics. He developed the law of movement of objects in a straight line. His math concepts were developed further years later by other experts.

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## Meditations of René Descartes

<https://www.britannica.com/biography/Rene-Descartes/Meditations>

In 1641 Descartes published the *Meditations on First Philosophy, in Which Is Proved the Existence of God and the Immortality of the Soul*. Written in Latin and dedicated to the [Jesuit](#) professors at the Sorbonne in Paris, the work includes critical responses by several eminent thinkers—collected by Mersenne from the Jansenist philosopher and theologian [Antoine Arnauld](#) (1612–94), the English philosopher [Thomas Hobbes](#) (1588–1679), and the [Epicurean atomist Pierre Gassendi](#) (1592–1655)—as well as Descartes's replies. The second edition (1642) includes a response by the Jesuit priest Pierre Bourdin (1595–1653), who Descartes said was a fool. These objections and replies [constitute](#) a landmark of cooperative discussion in [philosophy](#) and [science](#) at a time when dogmatism was the rule.

The *Meditations* is characterized by Descartes's use of [methodic doubt](#), a systematic procedure of rejecting as though false all types of [belief](#) in which one has ever been, or could ever be, deceived. His arguments derive from the [skepticism](#) of the Greek philosopher [Sextus Empiricus](#) (flourished 3rd century CE) as reflected in the work of the essayist [Michel de Montaigne](#) (1533–92) and the Catholic theologian [Pierre Charron](#) (1541–1603). Thus, Descartes's apparent knowledge based on authority is set aside, because even experts are sometimes wrong. His beliefs from [sensory](#) experience are declared untrustworthy, because such experience is sometimes misleading, as when



a square tower appears round from a distance. Even his beliefs about the objects in his immediate vicinity may be mistaken, because, as he notes, he often has dreams about objects that do not exist, and he has no way of knowing with certainty whether he is dreaming or awake. Finally, his apparent knowledge of simple and general truths of [reasoning](#) that do not depend on sense experience—such as “ $2 + 3 = 5$ ” or “a square has four sides”—is also unreliable, because God could have made him in such a way that, for example, he goes wrong every time he counts. As a way of summarizing the universal doubt into which he has fallen, Descartes supposes that an “evil genius of the utmost power and cunning has employed all his energies in order to deceive me.”

Although at this stage there is seemingly no belief about which he cannot entertain doubt, Descartes finds certainty in the [intuition](#) that, when he is thinking—even if he is being deceived—he must exist. In the *Discourse*, Descartes expresses this intuition in the dictum “I think, therefore I am”; but because “therefore” suggests that the intuition is an argument—though it is not—in the *Meditations* he says merely, “I think, I am” (“Cogito, sum”). The [cogito](#) is a logically self-evident truth that also gives intuitively certain knowledge of a particular thing’s existence—that is, one’s self. Nevertheless, it justifies accepting as certain only the [existence](#) of the person who thinks it. If all one ever knew for certain was that one exists, and if one adhered to Descartes’s method of doubting all that is uncertain, then one would be reduced to [solipsism](#), the view that nothing exists but one’s self and thoughts. To escape [solipsism](#), Descartes argues that all ideas that are as “[clear and distinct](#)” as the cogito must be true, for, if they were not, the cogito also, as a member of the class of clear and distinct ideas, could be doubted. Since “I think, I am” cannot be doubted, all clear and distinct ideas must be true.

On the basis of clear and distinct [innate ideas](#), Descartes then establishes that each [mind](#) is a mental substance and each body a part of one material substance. The mind or [soul](#) is immortal, because it is unextended and cannot be broken into parts, as can extended bodies. Descartes also advances at least two proofs for the existence of [God](#). The final proof, presented in the Fifth Meditation, begins with the proposition that Descartes has an innate idea of God as a perfect being. It concludes that God necessarily exists, because, if he did not, he would not be perfect. This [ontological](#) argument for God’s existence, introduced by the [medieval](#) English logician [St. Anselm of Canterbury](#) (1033/34–1109), is at the heart of Descartes’s [rationalism](#), for it establishes certain knowledge about an existing thing solely on the basis of reasoning from innate ideas, with no help from sensory experience. Descartes elsewhere argues that, because God is perfect, he does not deceive human beings, and therefore, because God leads humans to believe that the material world exists, it does exist. In this way Descartes claims to establish [metaphysical](#) foundations for the existence of his own mind, of God, and of the material world.

The [inherent](#) circularity of Descartes’s reasoning was exposed by Arnauld, whose objection has come to be known as the [Cartesian Circle](#). According to Descartes, God’s existence is established by the fact that Descartes has a clear and distinct [idea](#) of God; but the truth of Descartes’s clear and distinct ideas are guaranteed by the fact that God exists and is not a deceiver. Thus, in order to show that God exists, Descartes must assume that God exists.

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# René DESCARTES

## Father of Modern Philosophy

[https://www.storyofmathematics.com/17th\\_descartes.html/](https://www.storyofmathematics.com/17th_descartes.html/)

### Brief Profile

René Descartes has been dubbed the “**Father of Modern Philosophy**”, but he was also one of the key figures in the **Scientific Revolution of the 17th Century**, and is sometimes considered the first of the modern school of mathematics.

As a young man, he found employment for a time as a soldier (essentially as a mercenary in the pay of various forces, both Catholic and Protestant). But, after a series of dreams or visions, and after meeting the Dutch philosopher and scientist Isaac Beeckman, who sparked his interest in mathematics and the New Physics, he concluded that his real path in life was the pursuit of true wisdom and science.

Back in France, the young Descartes soon came to the conclusion that the key to philosophy, with all its uncertainties and ambiguity, was to build it on the indisputable facts of mathematics. To pursue his rather heretical ideas further, though, he moved from the restrictions of Catholic France to the more liberal environment of the Netherlands, where he spent most of his adult life, and where he worked on his dream of merging algebra and geometry.

In 1637, he published his ground-breaking philosophical and mathematical treatise “Discours de la méthode” (the “Discourse on Method”), and one of its appendices in particular, “La Géométrie”, is now considered a landmark in the history of mathematics. Following on from early movements towards the use of symbolic expressions in mathematics by [Diophantus](#), [Al-Khwarizmi](#) and François Viète, “La Géométrie” introduced what has become known as the standard algebraic notation, using lowercase  $a$ ,  $b$  and  $c$  for known quantities and  $x$ ,  $y$  and  $z$  for unknown quantities. It was perhaps the first book to look like a modern mathematics textbook, full of  $a$ 's and  $b$ 's,  $x^2$ 's, etc.

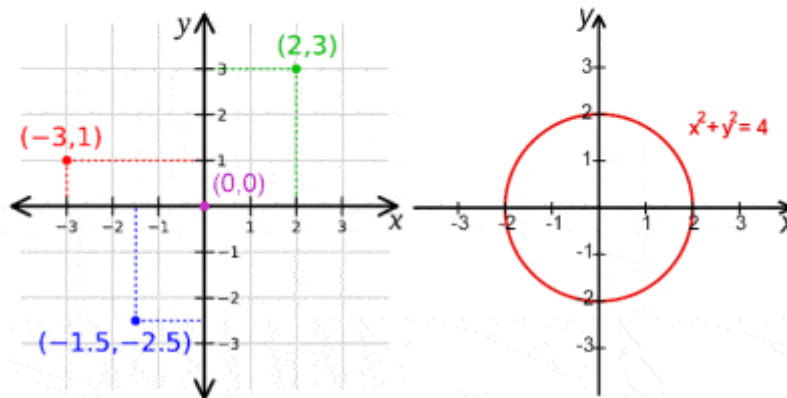
### **Cartesian Coordinate System**

It was in “La Géométrie” that Descartes first proposed that each point in two dimensions can be described by two numbers on a plane, one giving the point's horizontal location and the other the vertical location, which have come to be known as Cartesian coordinates. He used perpendicular lines (or axes), crossing at a point called the origin,



to measure the horizontal ( $x$ ) and vertical ( $y$ ) locations, both positive and negative, thus effectively dividing the plane up into four quadrants.

**Cartesian Coordinates** describe the position of a point in two dimensions by giving its horizontal and vertical locations, thus allowing a series of points generated by an algebraic equation to be plotted visually as a line or curve on a graph



### Cartesian Coordinates

Any equation can be represented on the plane by plotting on it the solution set of the equation. For example, the simple equation  $y = x$  yields a straight line linking together the points  $(0, 0)$ ,  $(1, 1)$ ,  $(2, 2)$ ,  $(3, 3)$ , etc. The equation  $y = 2x$  yields a straight line linking together the points  $(0, 0)$ ,  $(1, 2)$ ,  $(2, 4)$ ,  $(3, 6)$ , etc. More complex equations involving  $x^2$ ,  $x^3$ , etc, plot various types of curves on the plane.

As a point moves along a curve, then, its coordinates change, but an equation can be written to describe the change in the value of the coordinates at any point in the figure. Using this novel approach, it soon became clear that an equation like  $x^2 + y^2 = 4$ , for example, describes a circle;  $y^2 = 16x$  a curve called a parabola;  $x^2/a^2 + y^2/b^2 = 1$  an ellipse;  $x^2/a^2 - y^2/b^2 = 1$  a hyperbola; etc.

Descartes' ground-breaking work, usually referred to as analytic geometry or Cartesian geometry, had the effect of allowing the conversion of geometry into algebra (and vice versa). Thus, a pair of simultaneous equations could now be solved either algebraically or graphically (at the intersection of two lines). It allowed the development of [Newton's](#) and [Leibniz's](#) subsequent discoveries of calculus. It also unlocked the possibility of navigating geometries of higher dimensions, impossible to physically visualize – a concept which was to become central to modern technology and physics – thus transforming mathematics forever.

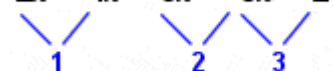
## Rule of Signs

Although analytic geometry was far and away Descartes' most important contribution to mathematics, he also: developed a "rule of signs" technique for determining the number of positive or negative real roots of a polynomial; "invented" (or at least popularized) the superscript notation for showing powers or exponents (e.g.  $2^4$  to show  $2 \times 2 \times 2 \times 2$ ); and re-discovered Thabit ibn Qurra's general formula for amicable numbers, as well as the amicable pair 9,363,584 and 9,437,056 (which had also been discovered by another **Islamic** mathematician, Yazdi, almost a century earlier).

**Descartes' "rule of signs" does not give the solution of a polynomial equation, but it does give information on the number of positive and negative roots of the polynomial. It says that:**

The number of positive roots of a polynomial  $P(x)$  is either:  
1) the number of times the sign changes  
or  
2) an even integer less than that number


**Example:**  $P(x) =$

$$2x^5 - 4x^4 - 6x^3 + 5x^2 - 2$$


**3 sign changes, so there are 3 or 1 real positive roots**

The number of negative roots of a polynomial  $P(x)$  is either:  
1) the number of times the sign changes in the negative polynomial  $P(-x)$   
or  
2) an even integer less than that number

**Example:**  $P(-x) =$

$$2(-x)^5 - 4(-x)^4 - 6(-x)^3 + 5(-x)^2 - 2$$
$$= -2(x)^5 - 4(x)^4 + 6(x)^3 + 5(x)^2 - 2$$


**2 sign changes, so there are 2 or 0 real negative roots**

Descartes noted that this rule only applies where the polynomial has a non-zero constant term, and where the polynomial is written in descending powers of  $x$ .

## Descartes' Rule of Signs

For all his importance in the development of modern mathematics, though, Descartes is perhaps best known today as a philosopher who espoused rationalism and dualism. His philosophy consisted of a method of doubting everything, then rebuilding knowledge from the ground, and he is particularly known for the often-quoted statement "Cogito ergo sum" ("I think, therefore I am").

He also had an influential rôle in the development of modern physics, a rôle which has been, until quite recently, generally under-appreciated and under-investigated. He provided the first distinctly modern formulation of laws of nature and a conservation principle of motion, made numerous advances in optics and the study of the reflection and refraction of light, and constructed what would become the most popular theory of planetary motion of the late 17<sup>th</sup> Century. His commitment to the scientific method was met with strident opposition by the church officials of the day.

His revolutionary ideas made him a centre of controversy in his day, and he died in 1650 far from home in Stockholm, Sweden. 13 years later, his works were placed on the Catholic Church's "Index of Prohibited Books".

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**Please visit these Web Link to know:**

## **[01] Timeline of Mathematics**

<https://mathigon.org/timeline>

## **[02] Mathematics of Descartes**

[https://www.maths.tcd.ie/pub/HistMath/People/Descartes/RouseBall/RB\\_Descartes.html](https://www.maths.tcd.ie/pub/HistMath/People/Descartes/RouseBall/RB_Descartes.html)

# **René Descartes**

[First published Wed Dec 3, 2008; substantive revision Mon Oct 23, 2023]

<https://plato.stanford.edu/entries/descartes/#Bib>

René Descartes (1596–1650) was a creative mathematician of the first order, an important scientific thinker, and an original metaphysician. During the course of his life, he was a mathematician first, a natural scientist or "natural philosopher" second, and a metaphysician third. In mathematics, he developed the techniques that made possible algebraic (or "analytic") geometry. In natural philosophy, he can be credited with several achievements: the first to publish the sine law of refraction; developer of an important empirical account of the rainbow; and proposer of a naturalistic account of the formation of the earth and planets (a precursor to the nebular hypothesis, that the planets formed from loose matter orbiting the sun). More importantly, he offered a new vision of the natural world, which shaped modern physics: a world of matter possessing a few fundamental properties and interacting according to a few universal laws. This natural world included an immaterial mind that, in human beings, was directly related to the brain, a position that led to the modern mind–body problem. In metaphysics (the search for the basic principles of everything there is), Descartes provided arguments for the existence of God and to show that the essence of matter is to be spatially extended, and that the essence of mind is thought (where "thought" includes sensory images as well as rational discourse). Descartes claimed early on to possess a special method, which was

variously exhibited in mathematics, natural philosophy, and metaphysics, and which came to include, or to be supplemented by, a method of doubt.

Descartes presented his results in major works published during his lifetime: the *Discourse on the Method* (in French, 1637), with its essays, the *Dioptrics*, *Meteorology*, and *Geometry*; the *Meditations on First Philosophy* (i.e., on metaphysics), with its Objections and Replies (in Latin, 1641, 2nd edn. 1642); the *Principles of Philosophy*, covering his metaphysics and much of his natural philosophy (in Latin, 1644); and the *Passions of the Soul*, on the emotions (in French, 1649). Works published posthumously included his *Compendium of Music* (in Latin, 1650), *Letters* (in Latin and French, 1657–67); *World, or Treatise on Light*, containing the core of his natural philosophy (in French, 1664); *Treatise on Man* (in French, 1664), containing his physiology and mechanistic psychology; and the *Rules for the Direction of the Mind* (in Latin, 1701), an early, unfinished work attempting to set out his method.

Descartes' works have been variously received and valued. Among the learned of his day he was considered to be a top mathematician, the developer of a new and comprehensive physics or theory of nature (including living things), and the proposer of a new metaphysics. In the years following his death, his natural philosophy was especially valued and discussed. His works were invoked in debates over the equality of women. In the eighteenth century, aspects of his science remained influential, as did his project of investigating the cognitive capacities of the knower in assessing the possibility and extent of human knowledge. He was also remembered for his skeptical arguments and for failing to provide a successful response to them in his metaphysics. In the nineteenth century, he was revered for his mechanistic physiology and theory that animal bodies are machines (are constituted by material mechanisms, governed by the laws of matter alone). The twentieth century variously celebrated his famous "cogito" starting point, reviled the sense data that some alleged to be the legacy of his skeptical starting point, and looked to him as a model of the culturally engaged philosopher. He has been variously seen as a hero and a villain; as a brilliant theorist forging new directions in thought and as harbinger of a cold, rationalistic, and calculative conception of human beings. Those new to the study of Descartes should engage his own works in some detail prior to developing a view of his legacy.

**NOTE: Kindly visit the cited Web Link to read the following details**

- 1. Intellectual Biography
  - 1.1 Early life and education

- [1.2 First results, a new mission, and method](#)
- [1.3 Metaphysical turn, comprehensive physics, \*Discourse\*](#)
- [1.4 The metaphysics and comprehensive physics revealed](#)
- [1.5 Theological controversy, \*Passions\*, and death](#)
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### [Author and Citation Information for "René Descartes"](#)

The latest version of the entry "[René Descartes](#)" may be cited via the earliest archive in which this version appears:

Hatfield, Gary, "René Descartes", *The Stanford Encyclopedia of Philosophy* (Summer 2024 Edition), Edward N. Zalta & Uri Nodelman (eds.), URL =

<<https://plato.stanford.edu/archives/sum2024/entries/descartes/>>.



# Quotations

René Descartes

<https://mathshistory.st-andrews.ac.uk/Biographies/Descartes/quotations/>

*Of all things, good sense is the most fairly distributed: everyone thinks he is so well supplied with it that even those who are the hardest to satisfy in every other respect never desire more of it than they already have.*

*Each problem that I solved became a rule which served afterwards to solve other problems.*

*If I found any new truths in the sciences, I can say that they follow from, or depend on, five or six principal problems which I succeeded in solving and which I regard as so many battles where the fortunes of war were on my side.*

*. . . thus, each truth discovered was a rule available in the discovery of subsequent ones.*

*It is very certain that, when it is not in our power to determine what is true, we ought to act according to what is most probable.*

*I concluded that I might take as a general rule the principle that all things which we very clearly and obviously conceive are true: only observing, however, that there is some difficulty in rightly determining the objects which we distinctly conceive.*

*I thought the following four [rules] would be enough, provided that I made a firm and constant resolution not to fail even once in the observance of them. The first was never to accept anything as true if I had not evident knowledge of its being so; that is, carefully to avoid precipitancy and prejudice, and to embrace in my judgment only what presented itself to my mind so clearly and distinctly that I had no occasion to doubt it. The second, to divide each problem I examined into as many parts as was feasible, and as was requisite for its better solution. The third, to direct my thoughts in an orderly way; beginning with the simplest objects, those most apt to be known, and ascending little by little, in steps as it were, to the knowledge of the most complex; and establishing an order in thought even when the objects had no natural priority one to another. And the last, to make throughout such complete enumerations and such general surveys that I might be sure of leaving nothing out. These long chains of perfectly simple and easy reasonings by means of which geometers are accustomed to carry out their most difficult demonstrations had led me to fancy that everything that can fall under human knowledge forms a similar sequence; and that so long as we avoid accepting as true what is not so, and always preserve the right order of deduction of one thing from another, there can be nothing too remote to be reached in the*



*end, or to well-hidden to be discovered.*

*When writing about transcendental issues, be transcendently clear.*

Quoted in G Simmons *Calculus Gems* (New York 1992).

*If we possessed a thorough knowledge of all the parts of the seed of any animal (e.g. man), we could from that alone, by reasons entirely mathematical and certain, deduce the whole conformation and figure of each of its members, and, conversely if we knew several peculiarities of this conformation, we would from those deduce the nature of its seed.*

*Cogito Ergo Sum. "I think, therefore I am."*

*I hope that posterity will judge me kindly, not only as to the things which I have explained, but also to those which I have intentionally omitted so as to leave to others the pleasure of discovery.*

*Perfect numbers like perfect men are very rare.*

*With me everything turns into mathematics.*

*It is not enough to have a good mind. The main thing is to use it well.*

*If you would be a real seeker after truth, you must at least once in your life doubt, as far as possible, all things.*

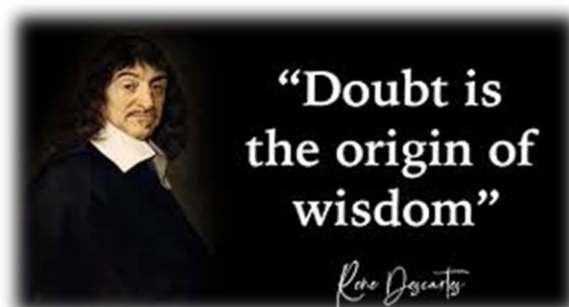
*... the two operations of our understanding, intuition and deduction, on which alone we have said we must rely in the acquisition of knowledge.*

### *Rules for the Direction of the Mind*

*Intuition is the undoubting conception of a pure and attentive mind, which arises from the light of reason alone, and is more certain than deduction.*

*I hope that posterity will judge me kindly, not only as to the things which I have explained, but also as to those which I have intentionally omitted so as to leave to others the pleasure of discovery.*

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# Impact of Rene Descartes on Mathematics

<https://www.cuemath.com/learn/rene-descartes/>

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## Introduction

Rene Descartes was a great French Mathematician and philosopher during the 17th century. He is considered as a precursor to the rationalist school of thought, and due to his vast contributions to the fields of mathematics and philosophy, he is often known as the 'Father of Modern Philosophy.'

## René Descartes - Father of Modern Philosophy-PDF

Rene Descartes was a great French Mathematician and philosopher during the 17th century. He is often known as the 'Father of Modern Philosophy.' Here is a downloadable PDF to explore more.

## Family Life of René Descartes

René Descartes was born in 1596 in La Haye en Touraine, France, to Joachim and Jeanne Descartes. His mother died when he turned one, and he also remained fairly ill throughout his childhood.

He and his siblings were raised by their grandmother, as their father used to be busy elsewhere with work and as a council member in the provincial parliament. Descartes never married, but he fathered a child in 1635 with Helena Jans van der Strom. The child was named Francine. Unfortunately, he died at the age of five due to scarlet fever.

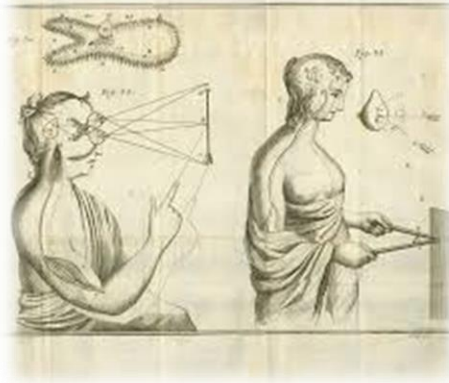


## Education and Career of Descartes

In 1606 Rene Descartes was sent to the Jesuit college at La Flèche, which was established in 1604 by Henry IV (reigned 1589–1610). At La Flèche, 1,200 young men were trained for military engineering careers, the judiciary, government administration, etc.

In addition to classical studies, science, mathematics, and metaphysics, they were taught acting, music, poetry, dancing, riding, and fencing.

In 1614 Descartes went to Poitiers, where he took a law degree in 1616.



In 1618 he went to Breda in the Netherlands, spending 15 months there as an informal student of mathematics and military architecture in the Protestant stadholder's peacetime army, Prince Maurice. There, he was encouraged in his studies of science and mathematics by the physicist Isaac Beeckman, for whom he wrote the *Compendium of Music*, his first surviving work.

In 1619, under Beekman's guidance, Descartes began serious work on mathematical and mechanical problems and, finally, leaving the service of Maurice of Nassau, planned to travel through Germany and join the army of Maximilian of Bavaria.

***"The reading of all good books is like conversation with the finest men of past centuries."***

It is during this year (1619) that Descartes was stationed at Ulm. He had three dreams that inspired him to seek a new scientific inquiry and envisage a unified science.

Soon afterward, in 1620, he began looking for this new method, started but never completed several works on the method, including drafts of the first eleven rules of *Rules for the Direction of the Mind*. He worked on and off it for years until he finally abandoned it for good in 1628. During this time, he also worked on other, more scientifically oriented projects such as optics.

From 1634-1636, Descartes finished his scientific essays *D'optique* and *Meteors*, which applied his geometrical method to these fields.

Descartes began work on *Meditations on First Philosophy* in 1639. The first edition of the *Meditations* was published in Latin in 1641, in which he listed six sets of objections and his replies. He published a second edition in 1642, which also included a seventh set of objections and replies and a letter to Father Dinet. Descartes defended his system against charges of unorthodoxy.

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## What was the impact of Rene Descartes on Mathematics?

René Descartes was a mathematician, philosopher, and scientist. He developed rules for deductive reasoning, a system for using letters as mathematical variables, and discovered how to plot points on a plane called the Cartesian plane.

This work was responsible for making Descartes famous in mathematics history because it was the invention of analytical geometry. Analytical geometry is basically applying algebra to geometry.

According to Descartes, mathematics was the only thing that is certain or true.

### ***"Conquer yourself rather than the world."***

René Descartes is most commonly known for his philosophical statement, "I think, therefore I am" (originally in French, but best known by its Latin translation: "Cogito, ergo sum"). He is also credited with the development of Cartesian dualism (also referred to as mind-body dualism), the metaphysical argument that the mind and body are two different substances that interact with one another.

In the mathematics sphere, his primary contribution was bridging the gap between algebra and geometry, which resulted in the Cartesian coordinate system, still widely used today.



He gave four main ideas for scientific progress, which are as follows:

1. Never accept anything as true until all reasons for doubt can be ruled out.
2. Divide problems into as many parts as possible and necessary to provide an adequate solution.
3. Thoughts should be ordered, starting with the simplest and easiest to know, ascending little by little, and, step by step, to more complex knowledge.
4. Make enumerations so complete, and reviews so general, that nothing is omitted.

Credited as the father of analytical geometry, Descartes was also one of the key figures in the Scientific Revolution.

His most famous work, *Meditationes de Prima Philosophia* (Meditations On First Philosophy) was published in 1641. In it, he provides a philosophical groundwork for the possibility of the sciences.

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### **Awards and Honors received by Descartes**

There was an annual award in science given by the European Union, called The Descartes Prize. It was named in honour of the French mathematician and philosopher, René Descartes.

There was a research prize, which was awarded to teams of researchers who had "achieved outstanding scientific or technological results through collaborative research in any field of science, including the economic, social science and humanities.". Nominations for this were submitted by either the research teams themselves or by suitable national bodies.

Proposals (also referred to as submissions) that were received were judged and a shortlist of nominees was announced, from which five Laureates (finalists) and five Winners were proclaimed at a prize ceremony in December each year.



The research prize was first awarded in 2000 and was discontinued in 2007. There was also a science communication prize which was started in 2004 as a part of the Descartes Prize, but in 2007 was separated to the Science Communication Prize.

***"But in my opinion, all things in nature occur mathematically."***

### **Legacy of Rene Descartes**

René Descartes gave shape to the contemporary study of the mind in the 17th century. In his *Meditations on First Philosophy*, Descartes begins with questions about what he can know. He carefully peels away anything that can be doubted from all that he has taken to be true.

He has been heralded as the first modern philosopher and is famous for having made an important connection between geometry and algebra, allowing the solution of geometrical problems by way of algebraic equations.

One of the deepest and most lasting legacies of Descartes' philosophy is his thesis that the mind and the body are really distinct—a thesis which is now called "mind-body dualism."

---

### **When did Descartes die?**

René Descartes succumbed to pneumonia at the age of 53. He was in Stockholm at the time to help the queen of Sweden set up an academy of science. Queen Christina who was only 22 years old at the time, made him rise before 5:00 AM for her daily lesson — this proved detrimental to his health, as he was used to sleeping late since childhood to accommodate his sickly nature.

One morning, Descartes caught a chill that proved to be fatal, very likely due to this early rising, combined with the freezing Swedish winters. He died on February 11, 1650, in Stockholm, Sweden.

***"Divide each difficulty into as many parts as is feasible and necessary to resolve it."***

---

### **Quotes of Rene Descartes**

- *"I think; therefore I am."*
  - *"If you would be a real seeker after truth, it is necessary that at least once in your life you doubt, as far as possible, all things."*
  - *"The greatest minds are capable of the greatest vices as well as of the greatest virtues."*
  - *"It is not enough to have a good mind; the main thing is to use it well."*
  - *"A state is better governed which has few laws, and those laws strictly observed."*
  - *"Everything is self-evident."*
-



## Summary

So here we come to the end of this article. In short, Rene Descartes was both a philosopher and a mathematician, a rationalist, who believed in reasons.

"The father of modern philosophy" who was interested in "certain" knowledge and the relationship between the body and the mind. Descartes was not a skeptic.

Descartes thought of two realities: thought & matter. These two have no contact with each other. Thus, Descartes was a dualist.

His contributions to mathematics were commendable. He bridged the gap between algebra and geometry, which resulted in the Cartesian coordinate system, still widely used today.

He died on February 11, 1650, in Stockholm, Sweden, at the age of 53.

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## Frequently Asked Questions (FAQs)

### What is Rene Descartes most famous for?

René Descartes invented analytical geometry and introduced skepticism as an essential part of the scientific method. He is regarded as one of the greatest philosophers in history. His analytical geometry was a tremendous conceptual breakthrough, linking the previously separate fields of geometry and algebra.

### When was Rene Descartes born?

René Descartes (born March 31, 1596, La Haye, Touraine, France—died February 11, 1650, Stockholm, Sweden), a French mathematician, scientist, and philosopher.

### What is the contribution of Rene Descartes?

René Descartes invented analytical geometry and introduced skepticism as an essential part of the scientific method. He is regarded as one of the greatest philosophers in history. His analytical geometry was a tremendous conceptual breakthrough, linking the previously separate fields of geometry and algebra.

René Descartes was a mathematician, philosopher, and scientist. He developed rules for deductive reasoning, developed a system for using letters as mathematical variables, and discovered how to plot points on a Cartesian plane.

### Who is the father of the Cartesian plane?

The invention of Cartesian coordinates in the 17th century by René Descartes (Latinized name: Cartesius) revolutionized mathematics by providing the first systematic link between Euclidean geometry and algebra.

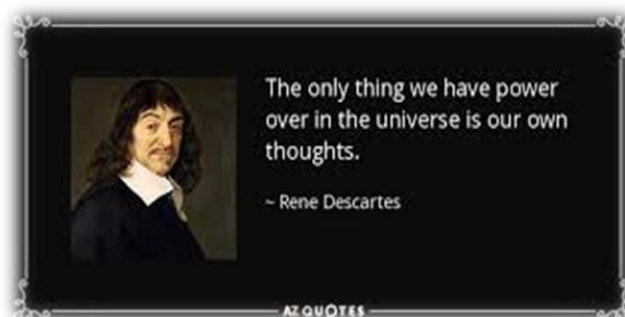
### What did Descartes invent?

Cartesian coordinate system and Cartesian Method.

### What is the Cartesian plane in math?

A Cartesian plane (named after French mathematician Rene Descartes, who formalized its use in mathematics) is defined by two perpendicular number lines: the x-axis, which is horizontal, and the y-axis, which is vertical. Using these axes, we can describe any point in the plane using an ordered pair of numbers.

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Kindly visit these Web Links to see the Videos!

01] PHILOSOPHY - René Descartes [8:48]

<https://www.youtube.com/watch?v=CAjWUrwx4>

02] René Descartes [23:13]

René Descartes (1596-1650) is one of the greatest thinkers of all time. He made important contributions to mathematics, physics, epistemology, metaphysics, and philosophy of mind. In this video, we'll take a look at Descartes's (pretty crazy) life, the intellectual background to his achievements, and three of his biggest and most enduring ideas.

<https://www.youtube.com/watch?v=nSDM15RYnW0>

03] René Descartes - Meditation #1 - The Method of Doubt

<https://www.youtube.com/watch?v=3GaEOGmZ2OQ> [40:58]

04] The Life of René Descartes (Documentary) [25:33]

<https://www.youtube.com/watch?v=5odTkf6PI2c>

05] The SCARY Philosophy of René Descartes [26:13]

What if everything you know—your memories, your surroundings, even **you\***—isn't real? Centuries ago, René Descartes asked this haunting question and arrived at a groundbreaking conclusion: **\*I think, therefore I am**. This simple yet profound idea became the foundation of modern philosophy. In this lecture, we'll explore the unsettling journey that led Descartes to this revelation and uncover how it challenges everything we believe about reality, existence, and the self. Prepare to question everything.

<https://www.youtube.com/watch?v=9xbw0TKV9wg>

06] A (very) Brief History of René Descartes [16:27]

In this episode, we cover the history of René Descartes, a 17th century French mathematician and philosopher who is considered both the father of analytic geometry and modern philosophy.

<https://www.youtube.com/watch?v=7BSLY2oiUOc>

07] Modern Philosophy: Rene Descartes

**Playlist <<:>> 43 Videos**

Videos on Rene Descartes -- most of them lecture videos from my classes, supplemented by shorter Core Concept videos.

Want to support my work making philosophy publicly accessible? Become a monthly supporter at Patreon <https://www.patreon.com/sadler> or just Buy Me a Coffee <https://www.buymeacoffee.com/A4quYdWoM>

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<https://www.youtube.com/playlist?list=PL4gvlOxpKKIjA4s0oNQ8JCKbS47fU3E7k>

## 08] René Descartes: A Journey Through Life and Philosophy

The life of René Descartes:

A documentary overlooking the life of the philosopher René Descartes. Cogito Ergo Sum is probably the most famous philosophy quote in history. Descartes was not just a great philosopher, but a scientist as well. So, I've been traveling in his footsteps to show you the places where he lived studied and worked. We visit places such as Paris, Amsterdam and La Haye, which is now named Descartes in his honor. Hope you'll enjoy this episode, it's been a pleasure making it.

<https://www.youtube.com/watch?v=du2csNXwSfg> [1:23:44]

## 09] Descartes Mind-Body Dualism [19:47]

What is the human mind, and how does it differ from our brain? According to Rene Descartes, the mind and the physical world are completely separate. Let's look at his theory and his arguments

<https://www.youtube.com/watch?v=ILYjZILQ7Os>

## 10] René Descartes - Meditation #6 [28:50]

<https://www.youtube.com/watch?v=5z kfRY1WJHc>

## 11] Rene Descartes | Meditations on First Philosophy ... [48:51]

Philosophers, Explained covers major philosophers and texts, especially the great classics. In each episode, Professor Hicks discusses an important work, doing a close reading that lasts 40 minutes to an hour.

René Descartes (1596-1650) was a French scientist, philosopher and mathematician. He was the developer of analytic geometry. The Cartesian coordinate system used algebra to describe geometrical figures.

In this episode, Dr. Hicks discusses the first and second meditations from Rene Descartes' 1641 book, Meditations on First Philosophy. Descartes asks "Of what can I be certain?" and reaches a negative conclusion.

<https://www.youtube.com/watch?v=w2-wQS01sDI>

## 12] Rene Descartes' Meditations on First Philosophy Part 2 ... [46:12]

<https://www.youtube.com/watch?v=VJmKrcc2INw>

## 13] René Descartes: The Origins of the Mind-Body Problem [1:00:06]

In his 1644 Principles of Philosophy, Descartes identified freedom with actions that are not pre-determined, even by the existence of divine foreknowledge.

<https://www.youtube.com/watch?v=OTITBh7YMs4>

## 18] Rene Descartes | Method of Doubt | Philosophical Methods ...

Rene Descartes is known for his Method of Doubt. This Method of Doubt is also known as Cartesian Method or Cartesian Skepticism. Rene Descartes doubted everything, even his own existence. He renounced all previous philosophical developments. He made a new start to find out the self-evident truths. The very first self-evident truth he found was "I think therefore I am." His Method of Doubt includes the following main points:

Three Arguments

Four Rules

Knowledge

<https://www.youtube.com/watch?v=xE3LS9YED28> [36:48]

## 19] Self Directed Study in Philosophy | Rene Descartes ...

This is the eighth in a new series of videos, providing advice, suggestions, and information for students and lifelong learners intending to engage in self-directed study of Rene Descartes. I discuss why Descartes would be useful, important, and worthwhile to study. I also suggest which of his books would be best to start with, and what other works you might move on to after those. There are motivations and methods important for understanding Descartes' own concepts and perspective, and I discuss keeping those in mind as you engage in study. I also suggest what problems or concerns you don't need to be overly concerned with when beginning study of Descartes.

<https://www.youtube.com/watch?v=gV-s3V4mYIk> [44:17]

## 20] René Descartes - Meditation #2 - I think, therefore, I am

This is a lecture video from Introduction to Philosophy. The lecture is about the second of Rene Descartes' Meditations on First Philosophy, originally published in Latin in 1641. In this meditation Descartes finds the first thing that he thinks he can know for certain: that he exists. The famous phrase "Cogito Ergo Sum" or "I think, therefore, I am" does not actually appear in the meditations. But this is the meditation where Descartes makes that point. After demonstrating his own existence, Descartes claims that the kind of thing that he is a thinking thing. He then discusses the nature of thought, and how his view of the human mind differs from Aristotle's conception.

[https://www.youtube.com/watch?v=beFeHuC\\_ERY](https://www.youtube.com/watch?v=beFeHuC_ERY) [22:48]

## 21] René Descartes - Meditation #4 - The Problem of Error

This is a lecture video about the fourth Meditation on First Philosophy by the French, 17th century, philosopher Rene Descartes. This meditation focuses on the problem of error, which is analogous to the better-known problem of evil. The problem is that in meditation #3 Descartes takes himself to have proven that God exists. But if God is all-good, then it seems impossible that God would have created Descartes in such a way that allow Descartes to come to false beliefs. Descartes claims to solve this problem by distinguishing between the faculty of knowledge or understanding or intellect, on the one hand, and the faculty of choice or freedom of the will, on the other.

<https://www.youtube.com/watch?v=lmkKgD76QCU> [26:06]

22] Rene Descartes, Passions of the Soul, part 1 - Introduction to ..

<https://www.youtube.com/watch?v=ZEAZI3H-Gc4> [47:47]

23] Rene Descartes | Meditations on First Philosophy ...

<https://www.youtube.com/watch?v=w2-wQS01sDI> [48:51]

I think, therefore  
I understand why I exist.

<https://avi-loeb.medium.com/i-think-therefore-i-understand-why-i-exist-0582d1eb2b09>



**Author: Avi Loeb**  
**[Sep 15, 2024]**



The philosopher [René Descartes](#) published in 1637 his first philosophical principle which in Latin reads "cogito, ergo sum," meaning "I think, therefore I am," followed in 1641 by "ego sum, ego existo" namely "I am, I exist."

Remarkably, it is possible to exist without much thinking. Those who spend their life on social media often believe a different variant: "I read about things, therefore they exist." But the truth is that the world realizes only a small fraction of what is possible on the

internet, and what is realized does not necessarily follow what we imagine it to be. The difference between our thinking and reality makes science a learning experience. Let me use two examples to illustrate the humbling scientific experience of learning from evidence rather than from our imagination.

When quantum mechanics was discovered a century ago, the response of prominent theoretical physicists, including Albert Einstein, was: “who ordered this?” We still do not have an intuitive understanding of the quantum measurement process through which the probability function of a system is reduced to a specific outcome, nor do we understand quantum entanglement — which Einstein referred to as “spooky action at a distance.” The human body contains numerous elementary particles whose quantum uncertainties average out. This allows classical physics to describe our daily experiences and makes it difficult to understand the quantum world. In the language of [Richard Feynman’s path integral](#), the quantum world involves a sum over all possible paths that a system can take between its initial and final state. The classical physics limit involves the path of least action.

In two weeks, I will host a reception for the beginning of the academic year at my home, in my role as director of the [Institute for Theory and Computation](#) at the Harvard-Smithsonian Center for Astrophysics. My colleague, Mark Reid, emailed me his regrets: “I had planned to come to the reception, but I will be in Madrid that day, on my way to a meeting on the Hubble tension in Barcelona.” In my reply to Mark, I admitted: “I truly regret that you are a classical object, because in the quantum world your wave function could have overlapped with my home at the same time that you are visiting Spain. On the other hand, communicating with you would have been very frustrating if you were a quantum object, because the quantum uncertainty principle would have meant that I can never get a straight answer from you. The experience would have been as bad as speaking to a politician.”

The second example for the learned difference between reality and our imagination involves the habitability of stars. Naively, we would have assumed that life is possible

around any star. In that case, the most common stars are red dwarfs, having about a tenth of the mass of the Sun but an abundance that is an order of magnitude larger.

However, observational data indicates that life is not easy near these abundant stars. Dwarf stars are much fainter than the Sun and so their habitable zone is much closer-in than the Earth-Sun separation. A rocky Earth-mass planet with an atmosphere needs to be closer to the nuclear furnace in order to maintain liquid water and the chemistry of life-as-we-know-it on its surface. For example, our nearest neighboring star, [Proxima Centauri](#), has 12% of the mass of the Sun and 0.16% of the luminosity of the Sun. The habitable zone distance scales approximately as the square-root of the star's luminosity, and is therefore 25 times closer in comparison to that for the Sun. As it turns out, this dwarf star hosts an Earth-size planet, [Proxima b](#), at about that distance.

The proximity of a habitable planet to a dwarf star has two implications. First, the planet becomes tidally locked, having a permanent dayside and nightside — similarly to the Moon showing the same side toward Earth throughout its orbit. The dayside is hot and the nightside is cold. When I mentioned this to my daughter, she said that if we ever move to Proxima b, she wants us to have a house on the strip that separates these two sides where the climate is most comfortable and we can see Proxima's sunset forever. I pointed out to her that there may be strong winds between the two sides because of their different temperatures.

Another challenge for life is the strength of the stellar wind at a close-in distance, resulting in stripping the atmosphere of the planet. If that happens, liquid water will evaporate and the planet will become a desert like Mars after the loss of the Martian atmosphere 2 billion years ago. On top of that, dwarf stars have strong flares in UV and X-rays that can further strip any remnants of the planet's atmosphere.

Finally, the surface temperature of dwarf stars like Proxima Centauri, is half that of the Sun, peaking in the infrared. This might suppress photosynthesis except during UV flares.



Ocean worlds are not helpful because life-as-we-know-it requires the interface between land and water. Puddles that dry up tend to concentrate chemical nutrients. In addition, a [recent study](#) suggested that rain droplets might have given rise to the earliest biological cells on Earth, and this is a phenomenon that requires landmass.

Dwarf stars live much longer than the Sun. Their lifespan is up to ten trillion years — a thousand times longer than that of the Sun. If intelligent life had been common around dwarf stars, we would have been most likely to live in the future, as I argued in [a paper](#) with Rafael Batista and David Sloan.

The above-mentioned challenges to habitability may explain why we reside at the current cosmic epoch on a planet near a rare star rather than being near the most abundant stars in the future.

All in all, scientific reasoning in astronomy and physics can be summarized by the phrase: “I think, therefore I understand why I exist.”



### About the Author

Avi Loeb is the head of the Galileo Project, founding director of Harvard University's — Black Hole Initiative, director of the Institute for Theory and Computation at the Harvard-Smithsonian Center for Astrophysics, and the former chair of the astronomy department at Harvard University (2011-2020). He is a former member of the President's Council of Advisors on Science and Technology and a former chair of the Board on Physics

and Astronomy of the National Academies. He is the bestselling author of “Extraterrestrial: The First Sign of Intelligent Life Beyond Earth” and a co-author of the textbook “Life in the Cosmos”, both published in 2021. His new book, titled “Interstellar”, was published in August 2023.



# René Descartes on Science, Philosophy, and God

{by [Troy Lacey](#) on March 31, 2020}

<https://answersingenesis.org/presuppositions/presuppositions/rene-descartes-on-science-philosophy-god/>

Though touted as a champion of rationalism and atheism, René Descartes worked in Christian context. Here we discuss Descartes on his philosophy of science and God.

\*\*\*\*\*

There are some people who, for whatever reason, seem to have been either iconically or erroneously labeled in popular perception, and that judgement clouds all future thoughts of the person. Occasionally it's an invention, experiment, or song (or other cultural reference) that we automatically associate with the person's name. If I mention the name Pavlov, what comes to mind? Bells and drooling dogs, most likely. If I say Edison, does a light bulb go off in your head? Sometimes it's judging a person's life (for good or ill) by one particular act, quote, or moment in history. If you were to hear someone mention "Watergate," you'd almost certainly think of Richard Nixon, and the fall of the Berlin Wall would probably make you think of Ronald Reagan (or maybe David Hasselhoff).

## **Placing Descartes Before Discourse?**

Perhaps in a similar way, one of history's most ill-labeled figures is René Descartes. Often thought of as a skeptic rationalist by Christians, largely because he's frequently touted as a dyed-in-the-wool humanist natural philosopher by the neo-atheist crowd. But is this really based on fact, or revisionist history?

*René was born on March 31, 1596, in La Haye, France  
(the town is now named Descartes, in his honor).*

In Danny Faulkner's recent article on [Richard Proctor](#), he mentioned a forthcoming Descartes article. What better day to run an article on Descartes than on what would

have been his birthday? Yes, René was born on March 31, 1596, in La Haye, France (the town is now named Descartes, in his honor). Little is known of his early life, except that his mother died when he was just a little over a year old, and that his father served in the Parliament of Brittany and was almost never home. Young René stayed with his grandmother and then his great uncle in his early years.

### **René Descartes—Education & Military Career**

In 1607, at the age of 11, Descartes entered the newly founded Jesuit College of La Flèche, where he graduated around 1614. His studies included Latin and Greek grammar, classical poets, philosophy (mostly Aristotelian) consisting of logic, morals, physics, and metaphysics. He also learned physics and mathematics in the final three years of study, including some works of Galileo. By the age of 18 Descartes had (for the time) a very well-rounded education. Not satisfied with just this, René, after graduation in 1614, studied for two years (1615–16) at the University of Poitiers, earning degrees in canon and civil law in 1616.

In 1618 René entered military service for several years. During this time period, most armies hired “mercenaries” to add to their existing force, and it was not uncommon for young men to join up for ideological or even strictly financial reasons.

### **Chance Meetings and Vivid Dreams**

*They immediately struck up a friendship, with Beeckman becoming a surrogate mentor to Descartes, influencing and urging him in mathematical studies.*

While in Breda serving with the army of Maximilian I, Duke of Bavaria in 1618, Descartes met Isaac Beeckman, a Dutch mathematician and natural philosopher (today we would call people such as Beeckman a scientist). They immediately struck up a friendship, with Beeckman becoming a surrogate mentor to Descartes, influencing and urging him in mathematical studies. It was during this time that Descartes made several key discoveries or advancements in mathematics, most notably adding algebraic coordinates and

formulae to geometry. Although it was close to another 200 years before his system was widely developed, it was named Cartesian geometry in his honor.

While in the town of Ulm (in southern Germany) on the night of November 10, 1619, Descartes had a series of three dreams which all pointed him to establishing a new method for scientific inquiry and unification of the sciences. Looking back on Descartes life, it is fairly evident that he dedicated his life to fulfilling that goal.

During the 1620s Descartes devoted most of his time to mathematics and science. As early as 1626 Descartes had formulated his laws on optics, although they did not see print until 1637. Descartes is usually credited as being the co-discoverer of the laws of refraction along with Snell, although Snell's unpublished work goes back to 1621.

### **Cogito Ergo Sum**

It was the 1637 publication of *The Discourse on Method* that became one of Descartes' most famous works. It included the *Discourse* and three scientific essays. *Optics and Meteorology* were purely scientific and *Geometry* was mathematical. The *Discourse* was what would today be called philosophical, but at that time, philosophy was considered a science, and the content of the *Discourse* was meant to be a methodology for seeking truth in science.

It is in the *Discourse* (written in French) that we first see the phrase "*Je pense, donc je suis*" ("I think, therefore I am")—the most famous quote from Descartes. He would later write this phrase in Latin "*Cogito ergo sum*" in his 1644 work *Principles of Philosophy* that brought the phrase into mainstream scientific (and later public) circles.

As Dr. Faulkner mentioned in his Proctor article, this is often portrayed as a defiant remark of mankind asserting himself above everything (including, in some circles, God) due to his intellect. But Descartes would likely have been appalled at this interpretation of his words. His starting point was that he had been given an intellect by God. Descartes then argued that the very fact of having a thinking mind pointed to an infinite mind which could only be God's.<sup>1</sup> In his "Second Meditation," from his 1641 work *Meditations on First Philosophy*, written in Latin, he expounded on his earlier French work *The Discourse on*

*Method*, and it was here that he first formulated his later *Cogito ergo sum*. It then follows in his "Third Meditation" that we learn more of Descartes' views of [God](#).

***Descartes constructs an argument for the existence of God that starts from the fact that he has an idea of an infinite being.***

Descartes constructs an argument for the existence of God that starts from the fact that he has an idea of an infinite being. The argument is intricate and, to the modern reader, perhaps a bit confusing. It invokes the metaphysical principle that "there must be at least as much reality in the efficient and total cause as in the effect of that cause."<sup>2</sup> Descartes then applies that principle not to the mere existence of the idea of God as a state of mind, but to the content of that idea. Descartes characterizes that content as infinite, and he then argues that a content that represents infinity requires an infinite being as its cause. He concludes, therefore, that an infinite being, or God, must exist. Descartes then argued that, if we think of the existence of a concrete physical world around us, as we all do, then an omnipotent, omniscient, and omnibenevolent God would ensure that such a world does in fact exist for us. He then equates in his "Fourth Meditation" an infinite being with a perfect being and asks whether a perfect being could be a deceiver. He concludes: "It is clear enough from this that he cannot be a deceiver, since it is manifest by the natural light that all fraud and deception depend on some defect."

In his "Fifth Meditation," Descartes reasons that the first and primary substance is God, whose essence is perfection. In fact, God is the only true substance, that is, the only being that is capable of existing on its own. The other two substances, mind and matter, are created by God and can only exist through his ongoing act of preservation or conservation, called God's "concurrence." It can be clearly seen from these discourses that Descartes was no atheist, and indeed tried to show through reason a basic ontological argument for God.

### **René Descartes—Trading Science for Philosophy?**

As mentioned above, philosophy was regarded as a science at this time, so there is no clear point at which we could claim Descartes went from "scientist" to "philosopher." But by the 1640s it is clear that he wrote more on the philosophy of science than he did on empirical scientific or mathematical topics. But we must remember that Descartes was

seeking to implement a methodology for “doing better science” with his philosophical arguments. The most likely reason Descartes is less remembered for his scientific contributions is that after his death he was labelled as “the father of modern philosophy.”

The science of Descartes’ day was heavily influenced by accepting Aristotelian ideas uncritically. Descartes deplored this inclination and fought against it. His clear intent was to show that God-given reason should be used in solving problems and seeking out truth, and that feelings-based philosophies should be scrutinized and questioned.

### **Skeptic, Rationalist, and Dualist**

*What causes many Christians to make Descartes out to be such a villain is his usage terms like rationalization, dualism, reductionism, metaphysics, natural philosophy, instinctual/mechanical philosophy, skepticism, and self-awareness.*

What causes many Christians to make Descartes out to be such a villain is his usage (and in many cases they were either inventions of or complete revolutions of) terms like rationalization, dualism, reductionism, metaphysics, natural philosophy, instinctual/mechanical philosophy, skepticism and self-awareness. In fact, at first blush, most Christians thinking of the above terms in how they are used today would likely label Descartes as antagonistic to God and Christianity. But as one of René’s contemporaries would have said “therein lies the rub.” The terms that Descartes either invented or brought to the public’s eye did not mean the same then as they do now, and in fact most of them are based (at least loosely) on biblical or [Christian](#) principles.

Descartes was a skeptic—of blindly accepting things that were not critically evaluated. He was a reductionist, in that he wanted to strip away all preconceived notions and take an idea or mechanical object apart and reformulate it. He was a dualist in that he believed that the mind and body were separate entities, and he also distinguished the consciousness from the brain. He was a rationalist who reasoned that an infinite God had given mankind an intellect, which in turn should be self-evident to humanity that there was an infinite God. He was a metaphysicist who believed in an absolutely certain and secure epistemological foundation for all that is or would be discovered.<sup>8</sup> Far from being anti-God, it can be easily shown that these principles are mentioned in Scripture and fit



within a biblical worldview ([Deuteronomy 11:18](#); [Job 38:36](#); [Psalms 147:5](#); [Proverbs 18:15](#), [25:2](#); [Ecclesiastes 1:13](#); [Romans 1:19–20](#); [1 Corinthians 6:20](#); [1 Thessalonians 5:23](#); [2 Timothy 1:7](#); [Hebrews 4:12](#)).

***While Descartes could not be described as an evangelical Christian, he can also not be lumped into the atheistic camp either.***

While Descartes could not be described as an evangelical Christian, he can also not be lumped into the atheistic camp either. Ultimately, whether he was a Christian or not is between him and God, and we just cannot know. But it should be noted that, although Descartes' believed in God and thought that human reasoning should (and did to him) point to an all-wise, benevolent and creator God, it was his reliance on human reasoning which later rationalists used to dismiss God.

Descartes' reasoning had established a physical world which was of a mathematical character and permitted math and physics to be used to explain it. And although God was integral and indispensable to Descartes' method of arriving at a physical world, "once such a world was accepted, it was no longer necessary to involve God in the description and measurement and explanation of how things work. Thus, the process of science was freed from theological constraints and interference."

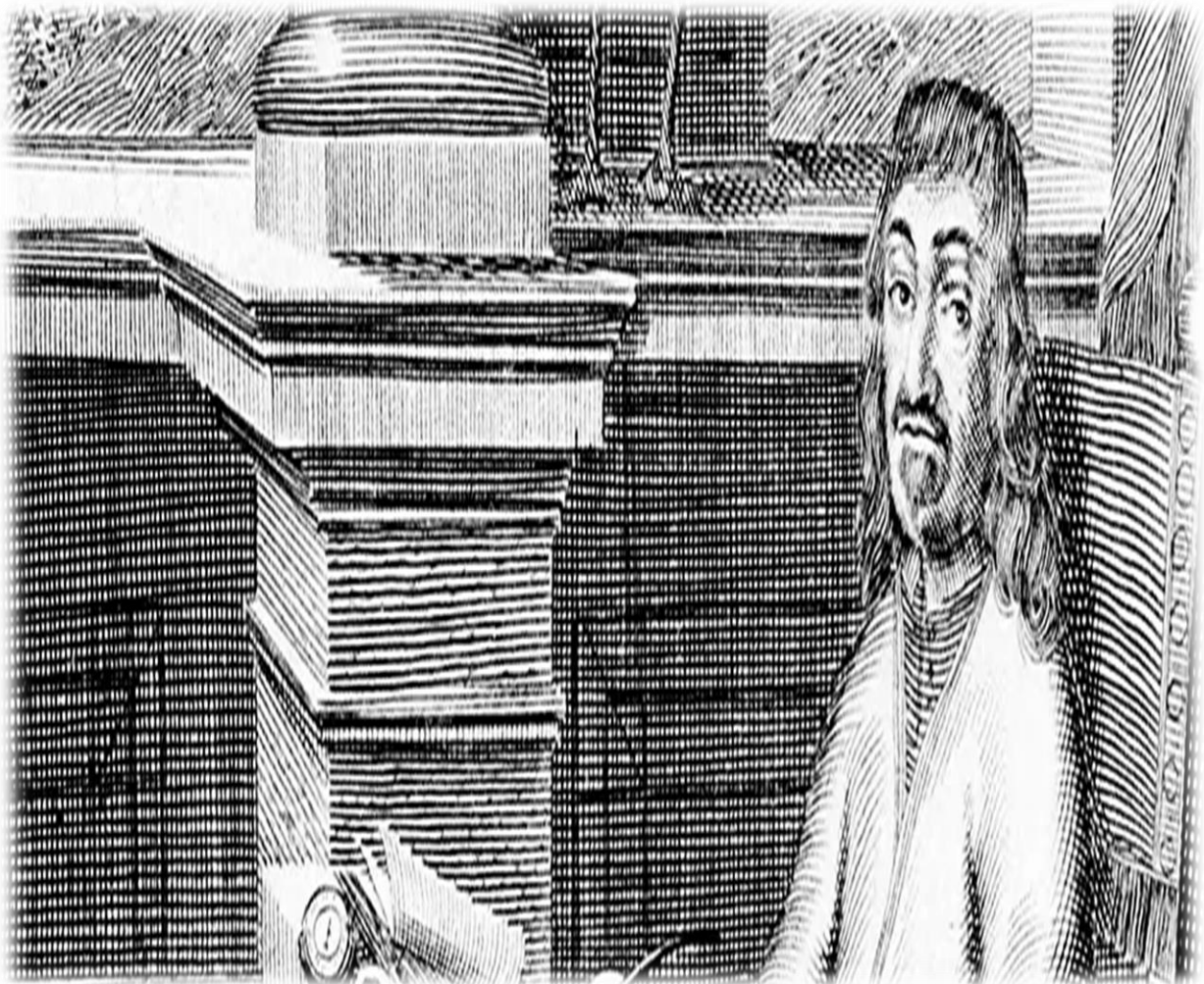
### **The Final Irony in René Descartes' Life**

As mentioned earlier, Descartes remained a Roman Catholic throughout his life. But as the [Galileo affair](#) occurred during his lifetime, he found that his philosophical rebellion against Aristotelian "science" was not viewed favorably by the Catholic church. In fact the Catholic church viewed him as a dangerous influence, putting his works on the Index of prohibited books (Index librorum prohibitorum) in 1663 (although some sources say 1667). In addition to his antagonism to Aristotelian influence on the sciences, his last published work, *Passions of the Soul* (1649) made the Catholic Church worried that his account of matter might be inconsistent with the Eucharist, and that he did not make the mind sufficiently independent of the body.

***After initial resistance from Protestant circles, many of his writings became popular, and even embraced.***

But after initial resistance from Protestant circles, many of his writings became popular, and even embraced. Some protestant philosophers like Kant, Berkeley, and Reid openly borrowed and then furthered Descartes' rational arguments for the existence of God. (However, they like Descartes also opened the door for rationalistic atheism). And it is telling that his most productive writing period in the 1630s occurred when he was in protestant Holland, with little fear of censorship as would have been the case in France. Towards the end of his life (October 1649), Descartes accepted a position as philosophy tutor to Queen Christina of Sweden. During his four months in Sweden, he wrote the statutes for the Swedish Academy of Arts and Sciences, and on February 1 he delivered them to Queen Christina. That same day he caught pneumonia and died ten days later on February 11, 1650. The philosopher and scientist died writing science and teaching philosophy.

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# Q&A: Descartes' decipherer

<https://www.nature.com/articles/483540a>

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Erik-Jan Bos, a philosopher at Utrecht University in the Netherlands, unearthed research gold with an Internet search. In putting together a critical edition of René Descartes' correspondence, due out in 2014, he discovered a stolen, never-before-published letter from the seventeenth-century French philosopher and mathematician. In the run-up to Descartes' 416th birthday on 31 March, Bos discusses the hazards of chasing him down.

Tell us about your Google search for a stolen letter.

I searched for 'Descartes' and 'autograph letter', and got a hit at Haverford College in Pennsylvania on the first page. The listing immediately caught my attention. I had been using those search terms for a few years, so I knew the first 30 hits very well. From this letter, to French mathematician Marin Mersenne, we learn that Descartes had changed the introduction to his 1641 book *Meditations on First Philosophy* at the last minute. The letter had been stolen in the nineteenth century by Guglielmo Libri, a gifted historian of mathematics and an ardent bibliophile and collector. Eventually he not only

bought manuscripts, but also stole them. He became an inspector of French public libraries, and looted them. He took about 80 autographed letters of Descartes from the Institut de France in Paris.



Dozens of René Descartes' letters have been missing since the mid-nineteenth century.

### How did they end up in the United States?

After he had cherished them for several years, Libri decided to sell. That is how his collection got dispersed. The scandal became public in 1848 and he fled to England. The majority of the letters returned to France, but about 30 were untraceable. Some were completely unknown and never published, such as the one I discovered at Haverford. It was a very rare find.

### Have any letters proven problematic?

The standard edition of Descartes' correspondence contains one letter that is a fake. It was copied from a novel of the late seventeenth century, which ridicules the belief that people can talk to spirits. The most notorious forger is Denis Vrain-Lucas, who sold thousands of counterfeited letters, supposedly by Descartes, Jesus, Mary Magdalene, Charlemagne, Aristotle, Lazarus before and after his resurrection, and so on. Once unmasked, Vrain-Lucas pleaded innocent, saying that the question of authenticity is trivial. The problem is that there is money to be made from forgery. A genuine letter from Descartes could sell for US\$200,000 or more.

### Why create a new edition of correspondence?



Erik-Jan Bos



The standard edition is a century old and contains a lot of supplements and errata; the next edition contains even more. The corpus is a nightmare. If you want to find particular material, you will get lost. With a new edition we can check formulae and mathematical texts. In previous editions, complete lines were left out, making the maths incomprehensible at times. Claude Clerselier, the first editor of Descartes' correspondence in the seventeenth century, wrote in the preface to the first collection that many of the manuscripts were difficult to decipher, so he had to guess. We can't be sure exactly what he did because the manuscripts he edited have vanished. After he died they went to a French scholar who died, then on to the next scholar who died, and finally all the material went back to the mother of the first scholar. I don't know what she did — maybe put them on the fire during a cold winter?

### How has the work of finding correspondence changed?

The amount of labour my predecessors had to go through is unimaginable. After I Googled the lost letter, the librarian at Haverford immediately took digital pictures of the manuscript, plugged in the camera and sent them to me. Twenty years ago, I would have had to wait for weeks. As for the search, half a century ago, if you went to a library in Paris, you could search for weeks and still miss important material. In the past decade, inventories of manuscripts have come online. But you have to be clever. If you just search for 'Descartes', you get millions and millions of hits.

### Why study Descartes' letters?

He comes alive. He looked down on contemporary philosophers, scientists and mathematicians, including Pierre de Fermat, with utter disdain. He also thought that he was always right. And there are unexpectedly personal letters. We have one by Descartes written to the local bailiff pleading for leniency towards an accused murderer. He wrote wonderful letters to friends who had lost loved ones. Other highlights include a marriage contract drawn up in 1644, for which one of the witnesses was Descartes. The bride was the mother of Descartes' daughter. He recognized his fatherhood but never married the mother, although presumably he saw to it that she got married. That contract was a way to take care of her.

### Has reading Descartes helped you with maths?

An encounter with maths in his letters can be like reading Greek. The seventeenth-century way of doing maths was different from today's: they were interested in other problems. We live in a post-Cartesian era, mathematically and philosophically.



# In praise of Descartes

11 Aug 2016 Robert P Crease

Taken from the August 2016 issue of *Physics World*

Robert P Crease responds to criticisms of René Descartes

made by Nobel laureate Steven Weinberg and others

<https://physicsworld.com/a/in-praise-of-descartes/>

In the Wallace Collection in London is a sculpture entitled “Descartes Piercing the Darkness of Ignorance”. Completed by Robert Guillaume Dardel in 1782, the sculpture shows the French philosopher, mathematician and scientist struggling to free himself from thick, enveloping clouds, inspired by rays of the Sun emerging from a hole in their midst. It casts René Descartes (1596–1650), who played a foundational role in both describing and using the scientific method, as a triumphant liberator. “No other great philosopher,” observes the venerable *Dictionary of Scientific Biography*, “except perhaps Aristotle, can have spent so much time in experimental observation.”

Recently, however, Descartes’ image has come under attack. Despite being a pop-culture celebrity for his philosophical remark “I think, therefore I am,” Descartes is routinely scorned for scientific and philosophical missteps. In his 2015 book *To Explain the World*, for instance, the Nobel-prize-winning physicist Steven Weinberg writes: “For someone who claimed to have found the true method for seeking reliable knowledge, it is remarkable how wrong Descartes was about so many aspects of nature...his repeated failure to get things right must cast a shadow on his philosophical judgement.”

Weinberg elaborates in crisp, no-nonsense prose: “[Descartes] was wrong in saying that the Earth is prolate (that is, that the distance through the Earth is greater from pole to pole than through the equatorial plane). He, like Aristotle, was wrong in saying that a vacuum is impossible. He was wrong in saying that space is filled with material vortices that carry the planets around in their paths. He was wrong in saying that the pineal gland is the seat of a soul responsible for human consciousness. He was wrong about what quantity is conserved in collisions. He was wrong in saying that the speed of a freely falling body is proportional to the distance fallen. Finally, on the basis of observation of several lovable pet cats, I am convinced that Descartes was also wrong in saying that animals are machines without true consciousness.”

How, then, can Descartes deserve to be portrayed as a herald of enlightenment?

The answer lies literally in the clouds – those from which Descartes is emerging in Dardel’s sculpture. These symbolize the lingering influence both of Aristotle and of the Church.

Sequestration



Aristotle's world was composed of different places (Earth and heavens) populated by different substances (on Earth, natural things and human creations) that obeyed different laws. In his work, *The World*, which Descartes planned to publish in 1633, he pictured a single universe full of mechanisms that obeyed the same laws. Plants, animals and human bodies were mechanisms (though the latter were connected to souls). The rest of the natural world, too, behaved mechanistically, from sticks and stones to the Sun, Moon and planets. "I have described...the whole visible world as if it were only a machine in which there was nothing to consider but the shapes and movements [of its parts]," Descartes wrote. The scientists' job was to figure out the mechanisms.

Then Descartes learned of Galileo's condemnation. Although he was living at the time in the Netherlands, where he was beyond the reach of the Roman Church, Descartes was a believing Catholic and refused to publish anything heretical. But a heliocentric universe, the reason for which the Church had condemned Galileo's work, was central to Descartes' mechanistic picture. He therefore withdrew *The World* and wrote an essay describing his personal path to the new science as the preface to three non-controversial scientific articles he published in book form.

Now known as the *Discourse on Method*, this essay is one of the finest pieces of philosophical writing. He wrote it in French rather than Latin, so "even those who have not been to school can understand it". In it, Descartes describes how one day – after long frustrations not knowing which of his beliefs were true, false or ungrounded – he sequestered himself and tried to set aside all received opinions to see if, among all his ideas and opinions, he could hit bedrock.

He could. Try saying to yourself – and meaning it – "I am not now thinking." You can't. No politician, theologian or even a God can convince you otherwise. That was only the first of an entire realm of truths that Descartes found he could know and reason about without theology and authority being at all relevant. If you do science this way, starting from clear and distinct ideas and making sure the results hang together like mathematics, he argued, you can't be heretical. Doing science is like sequestering yourself from the world and theological issues, and those who do it no more reject that world than sequestered members of a jury question the authority of the legal system that set them up.

### **The critical point**

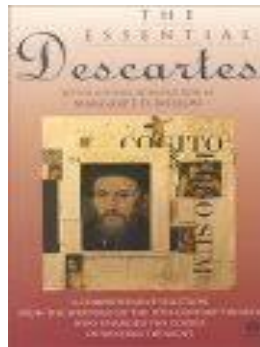
In the end, Descartes got many of the world's mechanisms wrong. But this should not obscure Descartes' foundational role in modern science. His far-reaching contribution was to demonstrate how much you can understand of the world when you compose and test mechanisms and models. In his widely read and influential *Discourse*, Descartes modelled for followers what it is to act like a scientist.

Imagine belittling Adam Smith's credentials as an economist just because his "pin factory" – the famous thought experiment that he deployed to show the benefits of the division of labour and capitalism – couldn't cut it in the modern marketplace. Or imagine

disparaging Copernicus's astronomical credentials because he pictured the planets as moving in circles rather than ellipses. While Weinberg is right that Descartes got many of the world's mechanisms wrong, this does not affect Descartes' foundational role in establishing the scientific method. For, ironically, Weinberg's criticism is based on a mechanistic way of thinking that it was Descartes' extraordinary contribution to help legitimate.

#### About the AUTHOR

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